H
0121-15-03
1939
2004
121-15

UNIVERSITY OF SASKATCHEWAN
COLLEGE OF AGRICULTURE

LIBRARY
MAY 17 1973
DEPARTMENT OF AGRICULTURE
EDMONTON, ALBERTA

Alfalfa Seed Production on the Grey Wooded Soils of Northern Saskatchewan

By T. M. STEVENSON, *Dominion Forage Crops Laboratory*
and J. MITCHELL, *Department of Soils*

THE production of alfalfa seed in Western Canada has, in the past, been confined largely to irrigated areas in Southern Alberta, although in recent years considerable quantities have been produced in the inter-lake region of Manitoba. Seed yields obtained under dry prairie conditions have usually been disappointing. The attention of growers and agronomists has recently been attracted to the possibility of producing alfalfa seed on the grey wooded soils of Northern Saskatchewan. Unusually high seed yields have been obtained, during recent years, by growers in the White Fox area, and settlers in other areas who are located on similar soils, are turning to alfalfa seed production in the hope of being equally successful. Whether all of the northern grey wooded soils are equally well adapted for the production of alfalfa seed remains to be seen; however, it is encouraging to note that satisfactory yields of seed were obtained from small plots located at a number of widely separated points.

The practices which have been most successful in the production of alfalfa in the prairie and park areas have not proven most successful on the grey wooded soils. This is not surprising in view of the very different conditions which prevail in those areas.

The growth and development of alfalfa plants on the grey wooded soils, as compared with those on the brown prairie and black park soils, differ in several important respects. Vegetative growth is reduced, and the plants produce fewer stems and lower percentages of leaf, which results in lower yields of hay per acre. There is usually little or no second growth produced by the seed-bearing plants grown on the grey wooded soil, so that ripening is comparatively uniform. Conditions, during the past several years, have been favorable for seed setting, and high seed yields have been obtained.

CLIMATE AND SOIL

The climate of Northern and Northeastern Saskatchewan is cool and relatively moist. Rainfall, in the grey soil zone, is not necessarily greater than that of the prairies or park belt. However, due to lower average temperature and wind velocity and higher relative humidity, the precipitation which does occur is more effective.

The natural vegetation of the grey soils is chiefly mixed wood, in which poplars and willows predominate. Hazelnut, dogwood, cranberry and wild peavine are commonly found in the undergrowth, together with a sparse growth of native grass.

In the natural state a leaf mould layer of about one inch in thickness occurs at the surface. Below this is the true mineral soil, the surface layer of which is moderately light in texture, and light grey in color. This layer varies from a few inches to a foot in depth and under cultivation powders readily to an ash-like grey dust when dry; after heavy rains it has a tendency to bake into a hard crust. Below this grey surface soil there occurs a compact layer having a coffee brown color. The deeper subsoil is usually moderately heavy, greyish in color, and contains quantities of lime carbonate.

The surface soil is neutral to slightly acid in reaction, but not sufficiently acid to require liming. As indicated by the grey color, the soil is low in organic matter and nitrogen. Black soils, such as are common in the park belt, contain from five to ten times the amount of organic matter and nitrogen found in these grey soils. In many

121/15

cases also the grey soils are low in mineral elements, particularly phosphorous and sulphur.

The low nitrogen content of these soils appears to favor the production of high yields of alfalfa seed, and to promote uniform maturity of the crop. The tendency toward deficiency of phosphorous and sulphur does not appear to seriously affect seed yields on new land, but may be a factor in reducing yields on older fields.

Sandy soils which have heavy subsoils are also producing satisfactory yields of alfalfa seed in northern areas.

CHOICE OF VARIETY

Grimm alfalfa is grown much more extensively throughout Western Canada than any other variety. It is unexcelled in winter hardiness, and equal or better than other varieties in yield of hay and seed. These are some of the reasons why Grimm alfalfa has long been recommended in Saskatchewan and why there has always been a good demand for seed of this variety.

It would seem, therefore, that farmers in Northern Saskatchewan who are planning on growing alfalfa for seed on the grey wooded soils would be well advised to use the Grimm variety. In the production of registered seed it is necessary to avoid natural crossing between varieties and to eliminate any danger of the seeds of different varieties becoming mixed during threshing and cleaning. For these reasons all the growers in a community should agree to use the same variety. In restricted alfalfa seed producing areas, established by law, the use of the Grimm variety is compulsory.

THE SEED

Source.—The use of northern grown seed is recommended. Seed produced in any part of the prairie provinces is classed as northern grown. In fact, the alternate freezing and thawing and lack of snow cover during the winters, in many of the prairie areas, provide conditions which are much more conducive to winter killing of alfalfa than those in the more northern areas where the crop is usually protected by a snow covering throughout the winter.

Freedom from Weed Seeds.—The introduction of weeds, whose seeds are difficult to separate from the seeds of alfalfa, constitutes one of the greatest menaces to alfalfa seed production. Growers located on new land which is relatively clean, should take every possible precaution to prevent the introduction of weeds, such as stinkweed, wild mustard, hare's ear mustard and others, which produce seeds similar in size and weight to the seeds of alfalfa. The first step in combatting this menace is the use of clean seed of the highest quality.

Registered and Elite Seed.—To be eligible for registration the alfalfa seed crop must be grown from either "registered" or "elite stock" seed. The growers who use these classes of seed are assured that the crop from which it was harvested was true to type for the variety which it represents, and they have accurate information as to the source of the seed.

Inoculation.—Inoculation of alfalfa seed is advisable under all conditions, and is particularly necessary when sown on new land. The benefits from inoculation are much more pronounced on the grey wooded soils than on soils which are higher in nitrogen. The most satisfactory method of inoculation is the use of pure cultures which may be obtained at a low cost from most seed houses. One bottle contains sufficient inoculant for sixty pounds of seed. Full directions for application is supplied with each bottle. In purchasing inoculant it is necessary to specify that it is for alfalfa.

PREPARATION OF THE LAND

Up to the present, most of the alfalfa grown on our northern grey wooded soils has been sown on new breaking. The common practice is to break the land the year before the crop is to be sown, although in some cases the land is broken and seeded the same year. This latter practice enables the grower to get returns from the land one year earlier, but native grasses and other plants are not likely to be completely destroyed and they may be the cause of lower yields in subsequent years. It is important that the land be free from debris which will interfere with seeding and harvesting operations. The use of some levelling implement, such as the plank drag, is desirable before seeding in most cases.

When seeding is to be done on land which was prepared the preceding season, thorough discing and harrowing is necessary, since these soils tend to bake hard in the spring of the year. For best results the land should be free from clods and worked down to a fine, mellow condition before the seed is sown.

SEEDING

Time.—While satisfactory stands have been established from seedings made at various dates from the middle of May until late July, it is generally agreed that

stronger, higher yielding plants usually result from seedings made before the end of June. Where cutworms are a pest seeding should be delayed until after June 15th.

Method.—The seed is usually sown broadcast. With a little experience seeding may be done satisfactorily by hand, but it is usually possible to obtain a more even distribution of the seed through the use of some mechanical device. The small "cyclone" seeder which is operated by hand, or the wheelbarrow type of seeder, are quite satisfactory, and may be purchased at a low cost. The seed is usually covered by the use of the spike-toothed harrow or a brush harrow. It is advisable to pack after harrowing.

Rate.—If the land has been well prepared and the seed is of high quality, from four to six pounds per acre is ample for a good stand. Many growers on the grey wooded soils have obtained excellent stands from sowing only five pounds of seed per acre. Very thick stands do not produce the highest seed yields, but stands which are too thin soon become contaminated with native grasses and weeds.

USE OF A NURSE CROP

Best results are usually obtained when the alfalfa is sown without a nurse crop. When a nurse crop of wheat, oats or barley is sown, the alfalfa plants make a relatively small growth during the year the crop is sown, and smaller yields of seed are obtained in the first crop year. The cereal grains yield poorly on these soils, and the income from a nurse crop is not usually sufficient to compensate for the reduced yields of alfalfa seed obtained. Flax is less competitive than the above crops and has been used successfully as a nurse crop.

CARE OF THE CROP

First Year.—Once the seed has been sown, and a satisfactory catch obtained, there is little the grower can do to improve the crop during the first year except to prevent the weeds from maturing seeds. If only a few weeds are present, they can be most easily destroyed by hand pulling. If the mower is used, the cutting bar should be set to cut high so as to injure the alfalfa plants as little as possible. It is not advisable to cut back the growth later than mid-August, since it is important that the alfalfa plants, in the first season, go into the winter with a strong top growth.

Second Year.—The practice of harrowing the alfalfa field early in the spring of the first crop year results in destruction of many small weeds and native grass plants. If the harrowing is done with a spike-tooth harrow, or with a spring-tooth harrow, the alfalfa plants will not be injured seriously. The use of the disc harrow for this purpose is likely to injure the alfalfa plants severely. This treatment of the field should be repeated in the spring of the second and succeeding crop years. In cases where there is an infestation of American Dragon Head, a native annual weed, the seeds of which are difficult to separate from those of alfalfa, it is advisable to harvest the first crop for hay. In cases of light infestations the weeds can be removed by hand pulling, and the first crop cut for seed. In the second and succeeding crops this weed is likely to cause little trouble.

HARVESTING

For Hay.—Alfalfa should be harvested for hay when about ten to twenty per cent. of the flowers have opened. Harvesting may be done most easily with the mower. A good practice is to let the hay lie in the swath until it is well wilted but not dry enough so that the leaves will fall off when it is being raked. Further drying takes place in the windrows, and the hay may then be set up in cocks to complete curing before it is stacked. The stacks should be capped with grass or straw, since the alfalfa hay itself does not shed water readily. During haying operations every precaution must be taken to retain the green color and to prevent the loss of leaf, since the quality of the hay is determined largely by these factors.

For Seed.—The alfalfa seed crop matures more uniformly on the grey wooded soils than it does on the dark park and brown prairie soils. Not only is maturity more uniform on the grey soils, but the condition of the plants at maturity is generally quite different. The whole plant, from the ground surface to the topmost branch usually becomes dry and ripe. Only rarely are green leaves in evidence; hence it is possible to allow the crop to stand until it is thoroughly mature and dry. At that stage it may be harvested and threshed without additional curing. A common practice is to harvest the crop and thresh it within two or three days.

When the crop is mature the seed pods are dark brown or black in color. At this stage most of the leaves have fallen, and the stems have become dry and brittle. The seed crop may be allowed to become quite mature without danger of loss of seed through shattering. The crop is usually not damaged by light fall frosts.

The binder is commonly used for harvesting the seed crop. Many growers prefer to throw the sheaves out loose. Some growers use a flax attachment and throw the

alfalfa out in bunches. When the crop is fully mature there is some loss of seed through pods being broken off during harvesting. This may be avoided to some extent by harvesting during early morning when the straw is slightly moist and tough.

The self-rake reaper is a suitable implement for harvesting the seed crop under conditions where it is not necessary to cure the alfalfa in stooks for long periods before threshing. This implement also throws the sheaves out loose, but it delivers them with a minimum of pressure so that few of the seed pods are broken off and lost.

The seed crop may be harvested with the mower and raked into windrows, and piled just as when cut for hay. This method results in heavy losses of seed. There are various bunching attachments which may be used on the mower to bunch the crop as it is being harvested. These attachments eliminate the necessity of raking, but usually give less satisfactory results than the binder.

THRESHING THE SEED CROP

The clover huller is the most satisfactory machine for threshing the alfalfa seed crop, but good work can be done with the ordinary grain separator or combine. It is essential that the alfalfa be thoroughly dry before threshing begins. The threshing machine must be properly adjusted if satisfactory results are to be obtained. It is important that the concave teeth be set up close. The use of corrugated cylinder teeth, which are designed especially for threshing alfalfa, helps to remove the seeds from the pods. In threshing, the wind blast should be adjusted so as to carry over as much of the light material as possible without loss of seed. The alfalfa should be fed slowly.

In areas where alfalfa matures completely and uniformly the crop may be economically harvested by using the combine harvester with the rubbing bar type of cylinder. Where fields are small and irregular in shape, the narrow cut power takeoff driven combine or the narrow self-propelled combine seem to be most suitable. The efficiency of the work obtainable with these types of machines is high, particularly when the crop is not tough. The sieve and wind blast adjustments should be such as to provide as much separation as possible without loss of seed.

USE OF FERTILIZER

Increased yields of seed have been obtained from the application of commercial fertilizers on alfalfa fields, in northern areas. Responses are more likely to be obtained on older stands, and also on lighter soils. The elements nitrogen, phosphorus and sulphur all appear to be required and the use of fertilizers containing all three is advised. These elements are present in such materials as 16-20 and 2-19 ammonium phosphates. The former fertilizer carries 16% nitrogen and 20% phosphate and the latter 2% and 19%, respectively. Both carry a sufficient amount of sulphur. The fertilizer is usually broadcast, although it would probably be advantageous to drill it with an attachment on a grain drill. Early application is essential for best results. If the material is broadcast, the land should be well harrowed following application. Rates of from 50 to 75 pounds per acre are suggested.

KEEP SWEET CLOVER OUT OF ALFALFA SEED PRODUCTION AREAS

Every effort should be made to discourage the growing of sweet clover in areas where the growers are concerned primarily with alfalfa seed production. The seeds of alfalfa and sweet clover are so similar in size and weight that they cannot be separated by seed cleaning or grading machinery, and alfalfa seed, which contains sweet clover, brings a lower price on the market. Once sweet clover has been introduced, much time and labor are required to eradicate it, since the seeds often live over in the soil for several years.

REGISTRATION OF THE SEED CROP

As previously stated, a crop is only eligible for registration when it is grown from "Registered" or "Elite Stock" seed. This class of seed is sold in bags which are sealed and tagged. The tag must be kept by the purchaser. In order to be registered the crop must be field inspected. Application for inspection service should be made to the Production Service—Plant Products Division, Federal Building, Saskatoon, before June 21st of the year in which inspection is required.

April 1937
Revised and Reprinted April 1939